



**Closeout Report**

**Director's Review  
of  
The Run IIb  
D-Zero Detector Upgrade  
Installation**

October 25, 2005

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## **Executive Summary**

### **Hardware Readiness**

- Essentially ALL Hardware except the AFEII is ready for installation!!!
- Some additional effort and tests will be applied between now and the March 2006 shutdown to improve installation readiness and / or reduce commissioning time following installation

### **Layer 0**

- Well prepared given 2004 shutdown measurements, analytical studies, and mock-up testing
- Bill Cooper gave a complete and clear description of Layer 0 mechanical installation plans
- Linda Bagby has Electrical installation for Layer 0 well in hand

### **Trigger**

- This is a complex portion of the upgrade that is as important to running D-Zero at high luminosities as is Layer 0
- Installation planning is in good shape for components (including cables) remaining to be installed
- Additional efforts and tests are planned during time till next shutdown to reduce commissioning time

### **Schedule**

- A convincing case was made for completing the required D-Zero installation in a 14 week shutdown
- Steps have been taken to judiciously utilize 2<sup>nd</sup> shift and some Saturdays to assure completion on schedule

### **Management**

- Although a formal installation organizational chart was not shown, the organization is clearly working well!
- An Installation Organization Chart should maybe be prepared for the record and for clarity

### **Conclusion**

- The D-Zero Collaboration has achieved a status where they could have begun installation on October 31, 2005 as had been planned
- Implementation of additional planned activity between now and the beginning of the March 1, 2006 shutdown will result in the team being even better prepared

## **1.0 Introduction**

A Director's Review of the Run IIb D-Zero Detector Upgrade Installation was held on October 25, 2005. The committee was charged to assess D-Zero's Shutdown and Installation Plans. The charge included a list of topics to be addressed as part of the review. The assessment of the Review Committee is documented in the body of this report.

Reference materials for this review are contained in the Appendices. The Charge for this review is shown in Appendix A. The review was conducted per the agenda shown in Appendix B. The Reviewer's assignments are noted in Appendix C and their contact information is listed in Appendix D. The Review Participants are listed in Appendix E. Appendix F is a table that contains all the recommendations contained in the body of this report.

## 2.0 Layer 0

### Knowns/Expected Issues

#### Recommendations

1. Re-check and measure the gravitational sag of L0.
2. Quantify and certify, if possible (accelerometers study?), the capabilities of the L0 transportation box to withstand and protect the L0 during the transportation. Study and mitigate risks during the human handling of the box in the transportation from SIDET to the D) Collision Hall.
3. Create a crew of "understudies" through extensive training at the mock-up station to have additional crew(s) available in case some of the major players of the L0 Installation (Roman, Butler, etc.) are not available or call in sick for a period during the 14 weeks shutdown. Have major players learn how to supervise the new crew.
4. Installation Procedure (18 pages document) is a super start. Continue its development, adding picture/drawings for explicative purpose, and ensuring that the primary crews and crews-in-training are aware and knowledgeable about all the steps listed.
5. Confirm the time schedule estimates with real-life installation exercises run at the existing L0 mock-up. Run the timing exercises in sequence, performing all the tasks one after the other and understanding the relationship between the end of one task the beginning of the next one. Simulate the D0 installation scenario as much as reasonably possible (i.e. un-installed and un-aligned rails, unglued L0 supports, etc). Feed the results into the main schedule.
6. Work with the PPD Management and the Directorate to develop a reporting methodology that allows the Lab management to look at the schedule developments at a level deeper than the ~20 official milestones reported during the review.

### Unknowns/Unexpected Issues

#### Recommendation

7. Within reason and limits, explore what-if scenarios that could hinder the L0 installation. Examples:
  - G10 disks for L0 mounts. Have extra available and ready for machining if the L0 supports are glued in the wrong position
  - Have the present beam pipe stored away and ready for re-installation if anything happened to the L0 beam-pipe.
  - Make sure PPD ES&H personnel is on call on day #1 of the shutdown for unexpected contamination issues.

### **3.0 Trigger**

#### **Technical Issues**

- General: The Trigger Upgrade project is to be congratulated for making excellent technical progress at this point. For the most part all of the trigger projects are on the original schedule and are making good use of the additional time afforded but the shutdown schedule change to make progress on system integration, system testing and algorithm development on the sidewalk. The planning for the installation is comprehensive and appears complete. All parts are in hand except the transition cards see recommendation below.
- Specific: electrical connector failures are a risk due to age of BLS cables and the sheer number of connections that will be exercised during installation. The project leaders recognize this as a significant risk, are expecting some level of problems and are planning mitigation techniques.

#### Recommendations

1. The completion of the production of the transition cards should be tracked to ensure it does not become an issue.
2. Continue system testing and integration as broadly and deeply as possible, continuing to emphasize moving toward physics data.

#### **Resources and Technical and Schedule risks**

- We do not see any technical risks. We just note that two small resource requests were mentioned in the schedule presentation but were not identified as needs in the project presentations.
- Comment - We expect management to recognize the importance of the trigger upgrade and distribute resources appropriately between Layer 0 and the trigger-upgrade installation tasks

#### Recommendation

3. Complete the L1Cal TRR report recommendation to detail the people assigned to specific tasks in order to do the resource analysis and solve resource problems well before the shutdown. This should address schedule risks for the project.

#### **Safety**

- The projects are aware of the existence of PORCs and ORCs.



## 4.0 Schedule

**Access and comment on the completeness of the shutdown schedule and appropriateness of the estimated duration of the shutdown to complete the work.**

- Seems quite complete,
- MS Project includes predecessors and successors
- Extensive list of procedures built into schedule

### Recommendation

1. Eliminate confusion with two schedule files by taking milestone dates determined for single shift schedule and setting dates for same milestones in the two-shift working schedule (2<sup>nd</sup> shift where appropriate + 6 Saturdays) with constraint type = “must finish” on. Weekend contingency must be used as it occurs, can’t bank it for later use

**Access and comment if the resources are appropriately identified to accomplish the required work and are plans in place to supply the needed resources for the installation work.**

- Planning looks very mature (had been preparing for 31oct05 start of shutdown) would have been close, more likely mid-November
- D0 has resources identified down to individuals named on Microsoft Project Plan. D0 has requested additional resources e.g. n-electrical technicians, under discussion with PPD.
- Concern – Many experts fully subscribed. Watch out for burnout – overtime, etc. Doesn’t take into account other D0 assignments (maintenance, etc.)

### Recommendation

2. Don’t loose focus! Set definite milestones for completion of the remaining legacy pre-shutdown tasks well before start of shutdown: test run fraction of system with as close as possible readouts now, pre-shutdown training, paperwork, ES&H, dress-rehearsals, etc. Make sure the status of these pre-shutdown tasks are monitored and checked.

**Access and comment if the technical and schedule risks inherent in the installation plan been adequately addressed to assure the installation schedule is achievable.**

- Working schedule (2<sup>nd</sup> shift where appropriate & 6 Saturdays) gives 13 day contingency for unanticipated delays (e.g. clean-up contamination, extra leak check, etc.), but did not address disaster scenarios, e.g. catastrophic failure of beam pipe. Such will be major laboratory impact
- Regular (weekly) status to Directorate and PPD will be necessary. D0 should set some number of milestones – how many? 20-100? Thermometer - % complete
- How does D0 understand whether it is still on schedule during shutdown? - Daily informal status information gathered by George Ginther and Weekly operations (upgrade + maintenance) meeting.

## **5.0 Project Management**

- The installation management organization was not shown. It is clear that George Ginther is in charge of the installation and the subsequent speakers are systems installation or commissioning managers; however this should be codified in an organization chart.
- The current organization appears to be working well, however this observation is based on a very limited review.
- The talks were all technical in nature and failed to address all of the topics in the Director's Review charge. For instance, it would have been useful to this reviewer if the talks had described the mechanisms in place to ensure that the schedule was credible, e.g. internal reviews, workshops, planning and coordination meetings. The talks should have also touched on the hazards that are unique to the installation and the means of mitigation.

**Appendix A**

**Charge for Director's Review  
of the  
Run IIb Detector Upgrade Installation  
October 25, 2005**

This Director's Review is to focus on D-Zero Shutdown and Installation Plans for the Run IIb Detector Upgrade. The committee is requested to assess and comment on the plans outlined by the presentations including the following topics:

- The technical plans for the Layer 0 Installation including experience gained with the mockup and installation exercises.
- The technical issues for trigger hardware installation.
- The completeness of the shutdown schedule and the appropriateness of the estimated duration of the shutdown to complete the work.
- The resources are appropriately identified to accomplish the required work and plans are in place to supply the needed resources for the installation work.
- The installation management structure and assigned personnel are appropriate to accomplish the installation activities.
- That the technical and schedule risks inherent in the installation plan have been adequately addressed to assure the installation schedule is achievable.
- That the overall safety issues have been assessed and appropriate plans are in place to mitigate risk exposure.

Please prepare and share an overall assessment of the readiness for installation and any recommendations for improvement in a closeout briefing with the D-Zero Project Team and Fermilab management at the end of the review and provide a written report shortly thereafter.

**Appendix B**

**Agenda for the Director's Review  
of the  
Run IIb-Zero Detector Upgrade Installation**

**October 25, 2005**

**Tuesday, Oct. 25**

**Snake Pit (WH2NE)**

8:00 – 8:30 AM	30	Executive Session (for Review Committee)	E. Temple
8:30 – 8:40 AM	10	Introduction	H. Montgomery
8:40 – 8:55 AM	15	Introduction/Orientation	G. Ginther
8:55 – 9:10 AM	15	Layer 0 Preparations	R. Lipton
9:10 – 10:10 AM	60	Layer 0 Mechanical Installation	B. Cooper
10:10 – 10:30 AM	20	Layer 0 Electrical Installation	L. Bagby
10:30 – 10:45 AM	15	BREAK	
10:45 – 11:05 AM	20	Trigger Upgrade Preparations	D. Wood
11:05 – 11:20 AM	15	Level 1 Central Track Trigger Installation	S. Gruenendahl
11:20 – 11:40 AM	20	Level 1 Calorimeter Trigger Installation	A. Stone
11:40 – 12:05 PM	25	Shutdown Schedule	R. Smith
12:25 – 1:00 PM		WORKING LUNCH	
1:00 – 3:30 PM		Executive Session w/Write-up and Dry run	
3:30 PM		Closeout	

## Appendix C

### Report Outline and Reviewer Assignments for the Director's Review of the Run IIb D-Zero Detector Upgrade Installation October 25, 2005

Executive Summary	<u>Ed Temple</u>
1.0 Introduction	<u>Dean Hoffer</u>
2.0 Layer 0 <ul style="list-style-type: none"> <li>• The technical plans for the Layer 0 Installation including experience gained with the mockup and installation exercises.</li> <li>• The resources are appropriately identified to accomplish the required work and plans are in place to supply the needed resources for the installation work.</li> <li>• That the technical and schedule risks inherent in the installation plan have been adequately addressed to assure the installation schedule is achievable.</li> <li>• That the overall safety issues have been assessed and appropriate plans are in place to mitigate risk exposure.</li> </ul>	<u>Giorgio Apollonari</u> , Bruce Baller
3.0 Trigger <ul style="list-style-type: none"> <li>• The technical issues for trigger hardware installation.</li> <li>• The resources are appropriately identified to accomplish the required work and plans are in place to supply the needed resources for the installation work.</li> <li>• That the technical and schedule risks inherent in the installation plan have been adequately addressed to assure the installation schedule is achievable.</li> <li>• That the overall safety issues have been assessed and appropriate plans are in place to mitigate risk exposure.</li> </ul>	<u>Vince Pavlicek</u> , Stephen Pordes
4.0 Schedule <ul style="list-style-type: none"> <li>• The completeness of the shutdown schedule and the appropriateness of the estimated duration of the shutdown to complete the work.</li> <li>• The resources are appropriately identified to accomplish the required work and plans are in place to supply the needed resources for the installation work.</li> <li>• That the technical and schedule risks inherent in the installation plan have been adequately addressed to assure the installation schedule is achievable.</li> </ul>	<u>Peter Garbincius</u> , Cat James, Dean Hoffer
5.0 Management <ul style="list-style-type: none"> <li>• The installation management structure and assigned personnel are appropriate to accomplish the installation activities.</li> <li>• The resources are appropriately identified to accomplish the required work and plans are in place to supply the needed resources for the installation work.</li> <li>• That the overall safety issues have been assessed and appropriate plans are in place to mitigate risk exposure.</li> </ul>	<u>Bruce Baller</u> , Ed Temple

\* Note underlined names are the primary writer.

## Appendix D

### Director's Review of the D-Zero Detector Upgrade Installation October 25, 2005

#### Reviewers' Contact Information

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## Appendix F

### Director's Review of the D-Zero Detector Upgrade Installation October 25, 2005

#### Participant List

##### Reviewers

Giorgio Apollinari, Fermilab  
Bruce Baller, Fermilab  
Peter Garbincius, Fermilab  
Dean Hoffer, Fermilab  
Catherine James, Fermilab  
Vince Pavlicek, Fermilab  
Stephen Pordes, Fermilab  
Ed Temple, Fermilab

##### Department of Energy

Paul Philp

##### Other Participants

Alice Bean, University of Kansas\*  
Jerry Blazey, Northern Illinois University  
Bob Hirosky, University of Virginia  
Jim Strait, Fermilab  
Nikos Varelas, Univ. of Illinois, Chicago Circle  
Terry Wyatt, University of Manchester

##### D-Zero Presenters

Linda Bagby, Fermilab  
William Cooper, Fermilab  
George Ginther, Fermilab  
Stefan Gruenendahl, Fermilab  
Ronald Lipton, Fermilab  
Richard Smith, Fermilab  
Alan Stone, University of Illinois, Chicago Circle  
Darien Wood, Northeastern University\*

##### Directorate

Jeff Appel, Fermilab  
Hugh Montgomery, Fermilab

\* Indicates attended by video conference

**Appendix G****Director's Review of the D-Zero Detector Upgrade Installation  
October 25, 2005****Table of Recommendations**

<b>Section &amp; No.</b>	<b>Recommendation</b>	<b>Assigned To</b>	<b>Status/ Action</b>	<b>Date</b>
<b>2.0</b>	<b>Layer 0 – Known/Expected Issues</b>			
2.1	Re-check and measure the gravitational sag of L0.			
2.2	Quantify and certify, if possible (accelerometers study?), the capabilities of the L0 transportation box to withstand and protect the L0 during the transportation. Study and mitigate risks during the human handling of the box in the transportation from SIDET to the D) Collision Hall.			
2.3	Create a crew of "understudies" through extensive training at the mock-up station to have additional crew(s) available in case some of the major players of the L0 Installation (Roman, Butler, etc.) are not available or call in sick for a period during the 14 weeks shutdown. Have major players learn how to supervise the new crew.			
2.4	Installation Procedure (18 pages document) is a super start. Continue its development, adding picture/drawings for explicative purpose, and ensuring that the primary crews and crews-in-training are aware and knowledgeable about all the steps listed.			
2.5	Confirm the time schedule estimates with real-life installation exercises run at the existing L0 mock-up. Run the timing exercises in sequence, performing all the tasks one after the other and understanding the relationship between the end of one task the beginning of the next one. Simulate the D0 installation scenario as much as reasonably possible (i.e. un-installed and un-aligned rails, unglued L0 supports, etc). Feed the results into the main schedule..			
2.6	Work with the PPD Management and the Directorate to develop a reporting methodology that allows the Lab management to look at the schedule developments at a level deeper than the ~20 official milestones reported during the review.			



Section & No.	Recommendation	Assigned To	Status/ Action	Date
<b>2.0</b>	<b>Layer 0 – Unknown/Unexpected Issues</b>			
2.7	<p>Within reason and limits, explore what-if scenarios that could hinder the L0 installation. Examples:</p> <ul style="list-style-type: none"> <li>• G10 disks for L0 mounts. Have extra available and ready for machining if the L0 supports are glued in the wrong position</li> <li>• Have the present beam pipe stored away and ready for re-installation if anything happened to the L0 beam-pipe.</li> <li>• Make sure PPD ES&amp;H personnel is on call on day #1 of the shutdown for un-expected contamination issues.</li> </ul>			
<b>3.0</b>	<b>Trigger</b>			
3.1	<p>The completion of the production of the transition cards should be tracked to ensure it does not become an issue.</p> <p>Continue system testing and integration as broadly and deeply as possible, continuing to emphasize moving toward physics data.</p>			
3.2	Continue system testing and integration as broadly and deeply as possible, continuing to emphasize moving toward physics data. Continue system testing and integration as broadly and deeply as possible, continuing to emphasize moving toward physics data.			
3.3	Complete the L1Cal TRR report recommendation to detail the people assigned to specific tasks in order to do the resource analysis and solve resource problems well before the shutdown. This should address schedule risks for the project.			
<b>4.0</b>	<b>Schedule</b>			
4.1	Eliminate confusion with two schedule files by taking milestone dates determined for single shift schedule and setting dates for same milestones in the two-shift working schedule (2 <sup>nd</sup> shift where appropriate + 6 Saturdays) with constraint type = must finish on. Weekend contingency must be used as it occurs, can't bank it for later use			

Section & No.	Recommendation	Assigned To	Status/ Action	Date
4.2	Don't loose focus! Set definite milestones for completion of the remaining legacy pre-shutdown tasks well before start of shutdown: test run fraction of system with as close as possible readouts now, pre-shutdown training, paperwork, ES&H, dress-rehearsals, etc. Make sure the status of these pre-shutdown tasks are monitored and checked.			

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